

Task 6.9 "International Integration"

Final Report

January 15, 1995

I. Introduction:

Task 6.9 "International Integration" had four subtasks. These were:

- Perform written translation of material from English-to-Russian and Russian-to-English pertaining to NASA and RSA ISSA specifications and standards.
- Provide Russian/English interpreter service for teleconferences and face-to-face meetings between Russian and NASA MSFC personnel involved with developing common ISSA specifications and standards.
- Develop a "Glossary of Key Words and Phrases" related to RSA ISSA specifications and standards.
- Establish a data base of translated RSA and NASA ISSA materials generated during the execution of this task.

The ISSA technical specifications and standards addressed in Task 6.9 were limited to those which affect crew safety, spacecraft survivability, and critical spacecraft interface requirements.

The objective of this effort was to generate information and data that would help NASA: 1) identify major differences in NASA and RSA specifications and standards, 2) gain a better understanding of RSA's ISSA hardware, 3) gain insight into RSA's approach and methodology for developing specifications and standards for ISSA hardware, and 4) minimize RSA flight hardware changes required to achieve functional compatibility while assuring that a safe crew environment is provided.

This objectives was met through the successful accomplishment of each of the tasks listed above. Each Task and its associated deliverables are discussed in the following paragraphs. In all cases, the deliverables called out in the contract were delivered to MSFC on time.

II. SUBTASK 1: "Perform written translation of material from English-to-Russian and Russian-to-English pertaining to NASA and RSA ISSA specifications and standards."

SAIC translated from Russian-to-English and English-to-Russian both NASA and RSA written material related to specifications and standards for crew safety, spacecraft survivability, and critical interfaces. Items that were translated included: material from specifications, standards, and requirements documents; correspondence such as memos and letters; and teleconference agendas.

(NASA-CR-197429) INTERNATIONAL
INTEGRATION Final Technical Report
(Science Applications International
Corp.) 18 p

N95-70774

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The deliverables for this task were as follows:

- Up to 1000 pages of translated material.
- A Monthly Progress Report stating the type of material and number of pages translated.
- Final Report.

A monthly progress report was prepared and delivered to MSFC for every month from April 1994 to November 1994. The activity in December 1994 and January 1995 are included as part of this Final Report.

Over the term of this contract, 272 items of material were translated, including 96 documents translated from Russian-to-English, 40 documents translated from English-to-Russian, 9 memos translated from Russian-to-English, 51 memos translated from English-to-Russian, and 79 teleconference agendas translated from English-to-Russian. A total of 1860 pages of material was translated either from Russian-to-English or English-to-Russian.

Below is a listing of the documents and correspondence translated from April 1, 1994 through January 15, 1995; they are tabulated by type and subject area. Note: the items that are italicized at the end of each section were translated in December 1994 or January 1995 and have not been submitted as part of a monthly report. As such, these documents are been submitted with this report and can be found in the binder entitled "Translations for December 1994" and in the Attachment 1 of this binder.

- **Russian-to-English General Documents - 96 total:**
 - Electromagnetic Compatibility (3 pages, Russian-to-English)
 - Table of Contents from KB Salut Designer's Handbook (2 pages, Russian-to-English)
 - Titles of Ionizing Radiation Russian Documents (1 page, Russian-to-English)
 - Memo Headings (1 page, Russian-to-English)
 - Assessment Method for "Natural" Offgassing (1 page, Russian-to-English)
 - Nonmetallic Material Test Procedure: Factor Standard - STP 351.125-82 (3 pages, Russian-to-English)
 - Technical Requirements for Metallization and Grounding of the Articles - 33y.0211.003 (4 pages, Russian-to-English)
 - Space Crew Radiation Safety During Space Flight - GOST 25645.202-83 (4 pages, Russian-to-English)
 - Certification N: For the Sample of Tested Polymer Material (2 pages, Russian-to-English)
 - NPO-Energia and Materialogy Department Organizational Charts (2 pages, Russian-to-English)
 - Radiation and Natural Earth Belts - GOST 25645.13g-86 (2 pages, Russian-to-English)
 - Expanded Aluminum Alloy Sheet, type Aluminum Magnesium 6 (AM6), High Quality - Technical Stipulations (2 pages, Russian-to-English)
 - Static Electricity Protection (5 pages, Russian-to-English)
 - Technical Requirements for Metallization and Grounding of Shield-Vacuum Thermal Insulation or Multi-Layer Insulation (9 pages, Russian-to-English)

- Guidelines: Spacecraft Crew Radiation Safety During the Space Flight (2 pages, Russian-to-English)
- Guidelines: Ionizing Radiation Space Craft Safety During Space Flight (6 pages, Russian-to-English)
- Radiation in Geomagnetic Field. Model of Low Energy Proton and Electron Streams - GOST 25645.155-91 (2 pages, Russian-to-English)
- Earth's Natural Radiation Belts - GOST 25645.138-86 (4 pages, Russian-to-English)
- Penetration of Cosmic Rays Into Earth's Magnetosphere - GOST 25645.121-85 (3 pages, Russian-to-English)
- Methodological Instructions: Solar Cosmic Rays - RD-50-25645.152-90 - 3 pages, Russian-to-English
- Solar Cosmic Rays: Model of Proton Fluxes - GOST 25645.134-86 (3 pages, Russian-to-English)
- High-Strength Steels and Alloys: Accelerated Test Methods for Corrosion Cracking - GOST 9.903-81 (26 pages, Russian-to-English)
- Methodology of Assessment: Limit Concentration of Oxygen During Combustion of Polymeric Materials (6 pages, Russian-to-English)
- Earth's Upper Atmosphere: Calculation Method of Density Variation Characteristics - GOST 25645.102-83 (7 pages, Russian-to-English)
- Plastics. Methods to Test Plastics' Resistance to Chemical Substances. GOST 12020-72 (22 pages, Russian-to-English)
- Sealants. Testing Methods for Resistance to Attack by Liquid Corrosive Media. GOST 9.068-76 (23 pages, Russian-to-English)
- Accelerated Test Methods on Corrosion Cracking. GOST 9.019-74 (23 pages, Russian-to-English)
- Polymeric Materials. Accelerated Test Methods Relative to Corrosivity. GOST 9.902-81 (19 pages, Russian-to-English)
- Total Scheme of Materials Selection (1 page, Russian-to-English)
- GOST 9.005-72, Allowable Contact Table for Alloys in Ambient and Hard Atmosphere Environment (1 page, Russian-to-English)
- Table of Contents for OST's and GOST's (2 pages, Russian-to-English)
- Basic Standards, Materials and Processes, Tables of Contents for GOST's and OST's (24 pages, Russian-to-English)
- Designers Handbook from "KB Salyut." (Excerpts) (11 pages, Russian-to-English)
- Atmosphere Density Models (5 pages, Russian-to-English)
- GOST Standard 23872-79, Electromagnetic Compatibility of Radio Electronic Equipment Nomenclature of Parameters and Technical Data Classification (1 page, Russian-to-English)
- GOST Standard 5.1944-73 (1 page, Russian-to-English)
- MP-5. Incoming Control and Storage of Metal Materials and Semi-Finished Instruction (12 pages, Russian-to-English)
- Non-metallic Materials. Test Method for Mass Loss and Content of Volatile Condensable Materials in a Vacuum-Thermal Environment (19 pages, Russian-to-English)
- Basic Method for Assessment of Material - Hazard Factors (3 pages, English-to-Russian)
- OST Standard 92-0920-85 (2 pages, English-to-Russian)

- Table of Contents from "KB Salyut" Designers Handbook (3 pages, English-to-Russian)
- OST - 1.92,000-90 "MP-4." Industry Standard - High Quality Sheets Made from an Aluminum Alloy AM-6 - Technical Requirements (31 oversized pages not included)
- Tables (4) from GOST 23752-79 (4 pages, Russian-to-English)
- Qualification & Acceptance Environmental Testing Requirements (43 pages, Russian-to-English)
- Questions and Comments to Joint Russian-American Document - "Electromagnetic Compatibility Requirements" (1 page, Russian-to-English)
- Russian Document #33Y.0221.003 "Technical Specification - Vessels" (6 pages, Russian-to-English)
- Russian Inputs to the Qualifications and Acceptance Environmental Test Requirements Matrix (9 pages, Russian-to-English)
- GOST 19.001-77: Unified System for Program Documentation - General Principals (2 pages, Russian-to-English)
- GOST 19.002-80: Unified System for Program Documentation - Flow-Charts. Conventions for Flow-Charting (10 pages, Russian-to-English)
- GOST 19.003-80: Unified System for Program Documentation - Flow-Charts. Graphical Flow-Chart Symbols (10 pages, Russian-to-English)
- GOST 19.004-80: Unified System for Program Documentation - Terms and Definitions (2 pages, Russian-to-English)
- GOST 19.005-85: Unified System for Program Documentation - R-Charts. Graphical Chart Symbols and Conventions for Charting (15 pages, Russian-to-English)
- GOST 19.101-77: Unified System for Program Documentation - Types of Programs and Program Documents (4 pages, Russian-to-English)
- GOST 19.102-77: Unified System for Program Documentation - Development Stages (5 pages, Russian-to-English)
- GOST 19.103-77: Unified System for Program Documentation - Indexing of Programs and Program Documents (2 pages, Russian-to-English)
- GOST 19.104-78: Unified System for Program Documentation - Basic Legends (6 pages, Russian-to-English)
- GOST 19.105-78: Unified System for Program Documentation - General Requirement for program Documents (2 pages, Russian-to-English)
- GOST 19.106-78: Unified System for Program Documentation - Requirements for Printed Documents (11 pages, Russian-to-English)
- GOST 19.201-78: Unified System for Program Documentation - Technical Specification for Development. Requirements for Contents and Form of Presentation (3 pages, Russian-to-English)
- GOST 19.202-78: Unified System for Program Documentation - Specification. Requirements for Contents and Form of Presentation (2 pages, Russian-to-English)
- GOST 19.301-79: Unified System for Program Documentation - Program and Methods of Testing. Requirements for Contents and Form of Presentation (2 pages, Russian-to-English)
- GOST 19.401-78: Unified System for Program Documentation - Text of Program. Requirements for Contents and Form of Presentation (1 page, Russian-to-English)

- GOST 19.402-78: Unified System for Program Documentation - Program Description (3 pages, Russian-to-English)
- GOST 19.403-79: Unified System for Program Documentation - List of Originals Holders (1 page, Russian-to-English)
- GOST 19.404-79: Unified System for Program Documentation - Explanatory Note. Requirements for Contents and Form of Presentation (2 pages, Russian-to-English)
- GOST 19.501-78: Unified System for Program Documentation - Technical and Operational Data Card. Requirements for Contents and Form of Presentation (6 pages, Russian-to-English)
- GOST 19.502-78: Unified System for Program Documentation - Description of Use. Requirements for Contents and Form of Presentation (1 page, Russian-to-English)
- GOST 19.503-79: Unified System for Program Documentation - System Programmer's Guide. Requirements for Contents and Form of Presentations (2 pages, Russian-to-English)
- GOST 19.504-79: Unified System for Program Documentation - Programmer's Guide. Requirements for Contents and Form of Presentations (1 page, Russian-to-English)
- GOST 19.505-79: Unified System for Program Documentation - Operation's Guide. Requirements for Contents and Form of Presentations (2 pages, Russian-to-English)
- GOST 19.506-79: Unified System for Program Documentation - Language Description. Requirements for Contents and Form of Presentations (2 pages, Russian-to-English)
- GOST 19.507-79: Unified System for Program Documentation - List of Operational Documentation (4 pages, Russian-to-English)
- GOST 19.508-79: Unified System for Program Documentation - Maintenance Manual. Requirements for Contents and Form of Presentations (1 page, Russian-to-English)
- GOST 19.601-78: Unified System for Program Documentation - General Rules for Duplication, Registration, and Storage (6 pages, Russian-to-English)
- GOST 19.602-78: Unified System for Program Documentation - Rules for Duplication, Registration, and Storage of Printed Program Documents (3 pages, Russian-to-English))
- GOST 19.603-78: Unified System for Program Documentation - General Rules for Insertion of Amendments (8 pages, Russian-to-English)
- GOST 19.604-78: Unified System for Program Documentation - Rules for Insertion of Amendments into Printed Program Documentation (4 pages, Russian-to-English)
- Russian Inputs to the Propellant Requirements Matrix (3 pages, Russian-to-English)
- Requirements for Qualification and Acceptance Testing Called for by RSA Standards to Correspond to NASA Document SSP 11472 Requirements (13 pages, Russian-to-English)
- GOST 15130-86: General Requirements - Optical Quartz Glass (32 pages, Russian-to-English)
- Paint and Lacquer Coatings (2 pages, Russian-to-English)

- Information About Gases Used in RSA-E Articles (1 page, Russian-to-English)
- OST 92-1020-89: Materials - Rules for Agreement of Application in the Articles (11 pages, Russian-to-English)
- OST 26-04-2590-82: Metals and Non-Metals - Materials in Contact with Liquid Oxygen. Safety Requirements (10 pages, Russian-to-English)
- GOST 18353-79: Nondestructive Testing - Classification of Types and Methods (20 pages, Russian-to-English)
- GOST 7512-82: Welded Joints - Radiographic Method (32 pages, Russian-to-English)
- *GOST 9.303-84: Unified System of Corrosion And Aging Protection, Metallic and Nonmetallic Inorganic Coatings - General Requirements of Selection (65 pages, Russian-to-English)*
- *GOST 9.305-84: Metallic and Nonmetallic Inorganic Finishes, and Various Processes for Obtaining Those Finishes (158 pages, Russian-to-English)*
- *GOST 9.308-85: Unified System of Corrosion and Aging Protection. Metal and Non-metal Inorganic Coatings - Procedures for Accelerated Corrosion (22 pages, Russian-to-English)*
- *GOST 9.048-89: Technical Parts Testing Methods for Impact of Molding Fungus (22 pages, Russian-to-English)*
- *GOST 9.049-89: Polymer Materials - Methods of Laboratory Testing for Impact of Molding Fungus (13 pages, Russian-to-English)*
- *GOST 9.050-89: Lacquers and Paints Coatings - Methods of Laboratory Testing for Impact of Molding Fungus (6 pages, Russian-to-English)*
- *GOST 25.602-80: Method of Mechanical Testing of Composite Materials with Polymer Matrix - Compression Testing at Normal, Elevated, and Low Temperatures (18 pages, Russian-to-English)*
- *TS 00.0357.0005: Investment Castings - Technical Specification (16 pages, Russian-to-English)*
- *TS 00.0357.0014: Titanium Alloy Castings - Technical Specifications (14 pages, Russian-to-English)*
- *Titles and First Paragraphs of the Following Documents - OST 92-0021-87, OST 92-1025-85, OST 92-0949-74, OST 92-1165-75, OST 92-1311-77, OST 92-1611-74, OST 92-1161-74, OST 92-4272-86, OST 92-1152-75, OST 92-5051-88, OST 92-4556-85, OST 1 90073-85, STP 33-32-75, M117-472-89, GOST 20415-82 (6 pages, Russian-to-English)*
- **English-to-Russian General Documents - 40 total:**
 - Flammability, Odor, Offgassing, & Compatibility Requirements & Test Procedures For Materials in Environments That Support Combustion (7 pages, English-to-Russian)
 - Space Station Ionizing Radiation Design Environment (10 pages, English-to-Russian)
 - EEE Parts Requirements For Space Station SSP 30312 (14 pages, English-to-Russian)
 - EMI/EMC & Electrical Grounding/Bonding (26 pages, English-to-Russian)
 - Materials & Processes Questions for NASA/RSA Assessment for ISSA (34 pages, English-to-Russian)

- Planning & Coordination Document on Solar Cycle Design Requirements (6 pages, English-to-Russian)
- Guidelines for "Cross Team Schedule Commitments" (3 pages, English-to-Russian)
- Electrical Bonding : Bonding Installations, Connections, Parts Impractical to bond with Jumpers, Circular Conductors, Dissimilar metals, Refinishing, Intermittent Electrical Contact, & Unapproved Bonding Methods (4 pages, English-to-Russian)
- Ionization Radiation Data Sent to NPO-E: Trapped Proton & Electron Nominal Radiation 4/28/94 (1 page, English-to-Russian)
- Draft Protocol: Solar Activity 5/27/94 - 2 pages, English-to-Russian)
- Follow-up Communication on May 16 Telecon on Solar Activity & Atmosphere Models (4 pages, English-to-Russian)
- Excerpts from SSP 30425 - Solar Cycle Information (9 pages, English-to-Russian)
- Table of Contents from MSFC-SPEC-1249 REVA (2 pages, English-to-Russian)
- Table of Contents from Mil-Std-889B (2 pages, English-to-Russian)
- Table of Contents from ANSI/AWS C3.7-93 (2 pages, English-to-Russian)
- Table of Contents from Mil-Std-1595A (4 pages, English-to-Russian)
- Table of Contents from MSFC-SPEC-504C (4 pages, English-to-Russian)
- Table of Contents from MSFC-SPEC-560A (3 pages, English-to-Russian)
- Table of Contents from Mil-Std-2175 (4 pages, English-to-Russian)
- Excerpt from "Specifications and Standards Joint Document Solar Activity Section Draft, June 30, 1994 (2 pages, English-to-Russian)
- Manned Space Vehicle Battery Safety Handbook - JSC-20793 (11 pages, English-to-Russian)
- MIL-STD-1576 (USAF), 31 July 1984 (5 pages, English-to-Russian)
- Proposed Wording for Russian Segment Specification - On-orbit Plasma Environment (1 page, English-to-Russian)
- Meteoroid/Orbital Debris Protection Protocol for TIM 12/Team 0 (4 pages, English-to-Russian)
- Draft - NASA/RSA Joint Specifications/Standards Document for the ISSA Russian Segment on Structural Design and Verification (18 pages, English-to-Russian)
- NHB 5300.4 (3K) - Design Requirements for Rigid Printed Wiring Boards and Assemblies (26 pages, English-to-Russian)
- NHB 5300.4 (3J) - Requirements for Printed Wiring Boards (17 pages, English-to-Russian)
- NHB 5300.4 (3I) - Requirements for Printed Wiring Boards (21 pages, English-to-Russian)
- Matrix Item for Battery Standards (1 page, English-to-Russian)
- Propulsion Requirements Matrix (5 pages, English-to-Russian)
- EEE Parts Requirements Matrix (3 pages, English-to-Russian)
- Structural Design and Verification Requirements Matrix (13 pages, English-to-Russian)
- Software Development Figures (2) and Document List (3 pages, English-to-Russian)

- Software Specs and Standards Requirements Matrix (30 pages, English-to-Russian)
- Electromagnetic Compatibility Document (36 pages, English-to-Russian)
- M&P Requirements Matrix (31 pages, English-to-Russian)
- TIM #13 Protocol Information (7 pages, English-to-Russian)
- NASA/RSA Assessment of Russian Specs and Standards Applied to the Russian Segment (225 pages, English-to-Russian)
- Cover Letter for the Draft copy of the "NASA/RSA Assessment of Russian Specs and Standards Applied to the Russian Segment" (2 pages English-to-Russian)
- Initial Version of Section 3.12 "Qualification and Acceptance Testing" of the "NASA/RSA Assessment of Russian Specs and Standards Applied to the Russian Segment" dated October 27, 1994 plus Cover Letter to Kudrjavitsev (5 pages English-to-Russian)
- **Letters/Memos/Fax's - 60 total:**
 - Memo: Pathfinder for Assessment of RSA Materials & Processes And Specifications & Standards (3 pages, English-to-Russian)
 - Memo: Plan for Assessment of RSA Materials & Processes, Specifications & Standards (6 pages, English-to-Russian)
 - Memo: Blanche 1 & 2 Assessment of Specifications & Standards (6 pages, English-to-Russian)
 - Memo: ISSA Program Specifications & Standards Task (Zubko Memo) (7 pages, English-to-Russian)
 - Memo: Acoustic Noise Teleconference held on 4/28/94 (1 page, English-to-Russian)
 - Memo: Program of Electromagnetic Compatibility MKS Materials (2 pages, Russian-to-English)
 - Memo: Questions for May 23 Telecon (1 page, English-to-Russian)
 - Memo: Subject: Telecon on Propellant and Oxygen Procurement, July 7, 1994 (1 page, English-to-Russian)
 - Memo: To Krylov, Subject: Telecon on External Contamination, July 7, 1994 (2 pages, English-to-Russian)
 - Memo: To NPO Energia from NASA, Subject: EEE Telecon, July 11, 1994 (1 page, English-to-Russian)
 - Memo: To NPO Energia from NASA, Subject: Structural Design and Verification Telecon, July 11, 1994 (1 page, English-to-Russian)
 - Fax: To NPO Energia, Subject: Ionizing Radiation Telecon (1 page, English to Russian)
 - Fax: Urgent Message from Tim Crumbley to Igor Zubko, "Software Standards Teleconference to be held on July 29, 1994 (1 page, English-to-Russian)
 - Memo: Specifications and Standards Teleconference on August 1, 1994 (1 page, English-to-Russian)
 - Memo: From I. Efremov to C. Finnegan on Window Cross-Section (1 page, Russian-to-English)
 - Memo: Cancellation of Propellant/Propulsion Teleconference for August 3, 1994 (1 page, English-to-Russian)

- Memo: From Stepanov to Anderson on Solar Activity Questions (1 page, Russian-to-English)
- Memo: From Finnegan to Vavulin - Cross-Sectional Drawing of NASA Spacecraft Windows (1 page, English-to-Russian)
- Memo: From Finnegan to Gollandtsev and Sofinski - Structural Design Teleconference on August 25, 1994 (1 page, English-to-Russian)
- Memo: From Chuck Daniel to V. Legostaev (1 page, English-to-Russian)
- Memo: From McRight to Sokolov - Propulsion Teleconference for August 26, 1994 (1 page, English-to-Russian)
- Memo: From Griffin to Sergeev - M&P Teleconference for August 26, 1994 (1 page, English-to-Russian)
- Memo: From Rowell to Zelenov - Qualification and Acceptance Teleconferences (1 page, English-to-Russian)
- Memo: From McRight to Sokolov - Propellant Teleconference for August 29, 1994 (1 page, English-to-Russian)
- Memo: From McRight to Sokolov - Propellant Teleconference for September 1, 1994 (1 page, English-to-Russian)
- Memo: From K. Jones to A. Prokofiev Requesting Specifications and Standards Teleconference on September 8, 1994 (1 page, English-to-Russian)
- Memo: From C. Finnegan to A. Gollandtsev on Draft for Structural Design and Verification Joint Spec for ISSA (1 page, Russian-to-English)
- Memo: From J. Brewer to N. Pinigin on Cancellation of Pinigin's Visit to NASA/MSFC (1 page, English-to-Russian)
- Memo: From J. Watts to Lobokov on Ionizing Radiation Teleconference held on September 22, 1994 (1 page, Russian-to-English)
- Memo: From J. Watts to Lobokov Requesting Ionizing Radiation Teleconference on September 29, 1994 (1 page, English-to-Russian)
- Memo: From D. Griffin to S. Naumov canceling the October 18, 1994 M&P teleconference, (1 page, English-to-Russian)
- Memo: From T. Crumbley to Y. Zaharov canceling the October 27, 1994 Software Specs and Standards teleconference (1 page, English-to-Russian)
- Memo: From C. Finnegan to A. Gollandtsev on Pressure Vessel Requirements (3 page, English-to-Russian)
- Memo: From J. Watts to Lobokov changing time of IR teleconference on October 31, 1994 (1 page, English-to-Russian)
- Memo: From K. Jones to S. Naumov confirming Specs and Standards November 1, 1994 teleconference (1 page, English-to-Russian)
- Memo: From P. McRight to Y. Porchenko Concerning Propellant Teleconference on November 3, 1994 (1 page, English-to-Russian)
- Memo: From T. Rowell to V. Kudrjavitsev Concerning Qualification and Acceptance Testing Teleconference on November 15, 1994 (1 page, English-to-Russian)
- Memo: From J. Brewer to N. Pinigin Concerning Battery Standards Teleconference on November 17, 1994 (1 page, English-to-Russian)
- Memo: From D. Griffin to S. Naumov Concerning M&P Teleconference on November 17, 1994 (1 page, English-to-Russian)
- Memo: From K. Jones to S. Naumov Concerning Specs and Standards Teleconference on November 22, 1994 (1 page, English-to-Russian)

- Memo: From D. Cockrell to S. Naumov Concerning OPM Teleconference on November 29, 1994 (1 page, English-to-Russian)
- Fax: To Roger Kroes from Oleg Mitichkin dated November 5, 1994 (4 pages, Russian-to-English)
- Fax: To Kathy Upshaw Jones and Dennis Griffin from V. Sergeyev dated November 8, 1994 (3 pages, Russian-to-English)
- Fax: To Kathy Upshaw Jones and Jeff Brewer from V. Penek dated November 10, 1994 (2 pages, Russian-to-English)
- Memo: From K. Jones to S. Naumov Concerning Specs and Standards Teleconference on December 7, 1994 and Teleconference Agenda for December 1994 (3 pages, English-to-Russian)
- Memo: From D. Griffin to S. Naumov Concerning M&P Teleconference on December 13, 1994 (1 page, English-to-Russian)
- Memo: From C. Finnegan to A. Gollandtsev Concerning Structural Design and Verification Teleconference on December 13, 1994 (1 page, English-to-Russian)
- Memo: From P. McRight to Y. Portyanko Concerning Propellant Teleconference on December 13, 1994 (1 page, English-to-Russian)
- Memo: From T. Rowell to V. Kudryatsev Concerning Qualification and Acceptance Environmental Test Requirements Teleconference on December 13, 1994 (1 page, English-to-Russian)
- Memo: From M. Martin to Y. Voloschenko Concerning EEE Parts Teleconference on December 14, 1994 (1 page, English-to-Russian)
- Memo: From J. Blanche to Y. Voloschenko Concerning Electrical M&P Teleconference on December 14, 1994 (1 page, English-to-Russian)
- Memo: From J. Watts to A. Lobokov Concerning Ionizing Radiation Teleconference on December 14, 1994 (1 page, English-to-Russian)
- Memo: From T. Crumbley to Y. Zaharov Concerning Software Standards Teleconference on December 14, 1994 (1 page, English-to-Russian)
- Memo: From J. Anderson to L. Chaikina Concerning Solar Cycle Teleconference on December 15, 1994 (1 page, English-to-Russian)
- Memo: From D. Trout to V. Vishnekov Concerning EMC/EMI Teleconference on December 15, 1994 (1 page, English-to-Russian)
- Memo: From J. Brewer to N. Pinigin Concerning Battery Standards Teleconference on December 15, 1994 (1 page, English-to-Russian)
- Memo: From M. McCollum to V. Sokolov Concerning ESD Teleconference on December 15, 1994 (1 page, English-to-Russian)
- Memo: From J. Blanche to Y. Voloschenko Concerning Electrical M&P Teleconference on December 20, 1994 (1 page, English-to-Russian)
- Memo: From J. Watts to A. Lobokov Concerning Ionizing Radiation Teleconference on December 20, 1994 (1 page, English-to-Russian)
- Memo: From P. McRight to Y. Portyanko Concerning Propellant Teleconference on December 20, 1994 (1 page, English-to-Russian)
- Memo: From C. Finnegan to A. Gollandtsev Concerning Structural Design and Verification Teleconference on December 20, 1994 (1 page, English-to-Russian)
- Memo: From T. Rowell to V. Kudryatsev Concerning Qualification and Acceptance Environmental Test Requirements Teleconference on December 21, 1994 (1 page, English-to-Russian)

- *Memo: From K. Jones to S. Naumov Concerning Specs and Standards Teleconference on December 22, 1994 (3 pages, English-to-Russian)*
- *Memo: From Jeff Anderson to Ludmilla Chaikina concerning NPO-E profile for solar cycle 24 (1 page, English-to-Russian)*
- *Memo: To Dave Cockrell from S. Naumov concerning MIR Spacecraft Figures for OPM Experiment (2 pages Russian-to-English)*
- *Memo: From Dave Cockrell to S. Naumov concerning Location Requirements and Considerations for OPM on MIR (2 pages, English-to-Russian)*
- *Memo: To Dawn Trout from V. Vishnekov concerning EMC Materials Agreement (1 page Russian-to-English)*
- *Memo: To Tom Rowell from V. Kudryatsev concerning RKK-E's preliminary assessment of the "document" (9 pages, Russian-to-English)*
- *Memo: From Tom Rowell to V. Kudryatsev concerning replacement pages to information transmitted earlier (1 page, English-to-Russian)*
- *Memo: From John Watts to A. Lobokov concerning Ionizing Radiation Tables (1 page, English-to-Russian)*
- **Teleconference Agendas - 79 total:**
 - Agenda: Ionizing Radiation Teleconference held on 4/19/94 (2 pages, English-to-Russian)
 - Agenda: EMC/EMI Teleconference held on 4/25/94 (1 page, English-to-Russian)
 - Agenda: Ionizing Radiation Teleconference held on 4/25/94 (1 page, English-to-Russian)
 - Agenda: Materials & Processes Standards Teleconference held on 4/28/94 (2 pages, English-to-Russian)
 - Agenda: External Contamination Teleconference held on 5/12/94 (2 pages, English-to-Russian)
 - Agenda: Solar Cycle Teleconference held on 5/16/94 (3 pages, English-to-Russian)
 - Agenda: External Contamination Teleconference held on 5/19/94 (2 pages, English-to-Russian)
 - Agenda: EMI/EMC Teleconference held on 5/23/94 (3 pages, English-to-Russian)
 - Agenda: Ionization of Radiation Teleconference held on 5/23/94 (1 page, English-to-Russian)
 - Agenda: M&P Teleconference held on 5/23/94 (2 pages, English-to-Russian)
 - Agenda: External Contamination Teleconference held on 5/24/94 (1 page, English-to-Russian)
 - Agenda: M&P Teleconference held on 5/26/94 (3 pages, English-to-Russian)
 - Agenda: MM/OD Teleconference held on 5/27/94 (1 page, English-to-Russian)
 - Agenda: Structural Design and Verification Teleconference held on 6/23/94 (2 pages, English-to-Russian)
 - Agenda: EEE Parts Teleconference held on 6/23/94 (2 pages, English-to-Russian)
 - Agenda: M&P Teleconference held on 6/27/94 (3 pages, English-to-Russian)

- Agenda: Fracture Mechanics Teleconference held on 6/30/94 (1 page, English-to-Russian)
- Agenda: Part I, Propellant Specifications and Requirements Telecon, July 7, 1994 (2 pages, English-to-Russian)
- Agenda: Solar Cycle Telecon, July 7, 1994 (2 pages, English-to-Russian)
- Agenda: EEE Parts Telecon, July 11, 1994 (2 pages, English-to-Russian)
- Agenda: Ionization Radiation Telecon, July 11, 1994 (2 page, English-to-Russian)
- Agenda: Questions for Materials and Processes Telecon, July 11, 1994 (8 pages, English-to-Russian)
- Agenda: Structural Design and Verification Telecon, July 11, 1994 (2 pages, English-to-Russian)
- Agenda: Materials and Processes Telecon, July 14, 1994 (4 pages, English-to-Russian)
- Agenda: Electronics Packaging Questions Telecon, July 18, 1994 (3 pages, English-to-Russian)
- Agenda: Second Propulsion Telecon, July 18, 1994 (2 pages, English-to-Russian)
- Agenda: EMI/EMC Telecon, July 21, 1994 (3 pages, English-to-Russian)
- Agenda: Qualifications and Acceptance Environmental/Test Requirements Telecon, July 21, 1994 (3 pages, English-to-Russian)
- Agenda: ESD Telecon, July 25, 1994 (2 page, English-to-Russian)
- Agenda: EEE Telecon, July 25, 1994 (7 pages, English-to-Russian)
- Agenda: Software Specifications and Standards Telecon, July 25, 1994 (3 pages English-to-Russian)
- Agenda: Materials and Processes Telecon, July 28, 1994 (4 pages, English-to-Russian)
- Agenda: Glass, Window, and Ceramic Structural Verification Telecon, July 28, 1994 (2 pages, English-to-Russian)
- Agenda: Battery Standards Teleconference held on 8/4/94 (3 pages, English-to-Russian)
- Agenda: Qualification and Acceptance Testing Teleconference held on 8/4/94 (4 pages, English-to-Russian)
- Agenda: M&P - Heat Treatment Teleconference held on 8/8/94 (4 pages, English-to-Russian)
- Agenda: EMI/EMC Teleconference held on 8/8/94 (1 page, English-to-Russian)
- Agenda: Structural Design and Verification Teleconference held on 8/8/94 (1 page, English-to-Russian)
- Agenda: Glass, Windows, and Ceramics Teleconference held on 8/11/94 (1 page, English-to-Russian)
- Agenda: Ionizing Radiation Teleconference held on 8/11/94 (1 page, English-to-Russian)
- Agenda: Software Teleconference held on 8/12/94 (4 pages, English-to-Russian)
- Agenda: Propulsion Teleconference held on 8/15/94 (2 pages, English-to-Russian)
- Agenda: EEE Parts Teleconference held on 8/15/94 (3 pages, English-to-Russian)

- Agenda: Battery Standards Teleconference held on 8/15/94 (2 pages, English-to-Russian)
- Agenda: M&P Teleconference held on 8/15/94 (4 pages, English-to-Russian)
- Agenda: M&P - NDE Requirements Teleconference held on 8/18/94 (5 pages, English-to-Russian)
- Agenda: Electrical M&P Teleconference held on 8/22/94 (3 pages, English-to-Russian)
- Agenda: Propulsion Teleconference held on 8/22/94 (3 pages, English-to-Russian)
- Agenda: Software Teleconference held on 8/22/94 (11 pages, English-to-Russian)
- Agenda: Qualification and Acceptance Testing Teleconference held on 8/25/94 (10 pages, English-to-Russian)
- Agenda: ESD Teleconference held on 8/25/94 (2 pages, English-to-Russian)
- Agenda: M&P - Casting and Forging Teleconference held on 8/29/94 (5 pages, English-to-Russian)
- Agenda: Software Teleconference held on 9/2/94 (1 page, English-to-Russian)
- Agenda: Software Specs and Standards Team (2 pages, English-to-Russian)
- Agenda: Ionizing Radiation Teleconference held on 9/24/94 (1 page, English-to-Russian)
- Agenda: ESD Teleconference held on 9/28/94 (5 pages, English-to-Russian)
- Agenda: Ionizing Radiation Teleconference held on 10/18/94 (1 page, English-to-Russian)
- Agenda: EMC/EMI Teleconference held on 10/18/94 (2 pages, English-to-Russian)
- Agenda: Battery Standards Teleconference held on 10/20/94 (2 pages, English-to-Russian)
- Agenda: Structural Design and Verification Teleconference held on 10/25/94 (1 pages, English-to-Russian)
- Agenda: Propulsion Teleconference held on 10/27/94 (1 pages, English-to-Russian)
- Agenda: Ionizing Radiation Teleconference held on 10/31/94 (2 pages, English-to-Russian)
- Agenda: M&P Teleconference held on 10/31/94 (1 page, English-to-Russian)
- Agenda: EMC/EMI Teleconference held on 11/08/94 (4 pages, English-to-Russian)
- Agenda: MIR OPM Teleconference held on 11/01/94 (1 page, English-to-Russian)
- Agenda: Battery Standards Teleconference held on 11/08/94 (1 page, English-to-Russian)
- Agenda: Materials and Processes Teleconference held on 11/08/94 (6 pages, English-to-Russian)
- Agenda: MIR OPM Teleconference held on 11/30/94 (1 page, English-to-Russian)
- Agenda: *Software Standards Teleconference held on 12/14/94 (1 page, English-to-Russian)*

Attached as part of this report is a listing - by subject matter - of all Russian technical documents and correspondence that has been received, regardless of source, during the course of this program (see Attachment 1)

III. SUBTASK 2: "Provide Coordination of, and Russian/English Interpreter service for, teleconferences between Russian and NASA MSFC personnel; provide Russian/English Interpreter service for face-to-face meetings between Russian and NASA MSFC personnel."

SAIC acted as NASA MSFC's focal point and coordinator for NASA/RSA teleconferences as directed by the NASA MSFC COTR. This coordination consisted of working with the appropriate MSFC and JSC personnel to determine topics for discussion, availability of personnel, agendas, meeting locations, and teleconference availability.

Numerous teleconferences and face-to-face meetings were held between Russian RSA and NASA MSFC personnel. The face-to-face meetings occurred during two NASA trips to Russia - one in June and the other in September. SAIC provided real-time oral translation and interpretation for both Russian and NASA MSFC personnel during these teleconferences and face-to-face meetings. In order to assure clear understanding of information presented, SAIC provided comprehensive "minutes" for all teleconferences.

The deliverables for this task were as follows:

- Teleconference Schedules and Agendas.
- "Minutes" of teleconference proceedings.
- A Monthly Progress Report stating number and subject area of teleconferences and meetings supported along with a complete set of minutes generated during the report period.
- Final Report.

SAIC initially proposed to support up to 103 teleconferences during the period of performance of the contract. In fact, we support 123 teleconferences. The following table shows by month the "proposed" and "actual" number of telecons supported.

<u>Month</u>	Number of Teleconferences	
	<u>Proposed</u>	<u>Actual</u>
Apr	9	9
May	11	11
Jun	3	3
Jul	19	21
Aug	26	32
Sep	6	5
Oct	17	10
Nov	12	11
Dec	0	18
Jan	0	3

The following is a listing of the teleconferences:

<u>Subject Area</u>	<u>Teleconference Date</u>
Ionization Radiation (IR)	4/19/94
Materials and Processes (MP)	4/21/94
Solar Cycle (SC)	4/21/94
Specifications and Standards (SS)	4/21/94
Electromagnetic Contamination/Interference (EMC/EMI)	4/25/94
Ionization Radiation (IR)	4/26/94
Ionization Radiation (IR)	4/28/94
Materials and Processes (MP)	4/28/94
Acoustic Noise (AN)	4/28/94
External Contamination (EC)	5/12/94
Solar Cycle (SC)	5/16/94
Specifications & Standards (SS)	5/16/94
Materials & Processes (MP)	5/16/94
External Contamination (EC)	5/19/94
Electromagnetic Contamination/Interference (EMC/EMI)	5/23/94
Ionization Radiation (IR)	5/23/94
Materials & Processes (MP)	5/23/94
Specifications & Standards (SS)	5/23/94
External Contamination (EC)	5/24/94
Materials & Processes (MP)	5/26/94
Structural Design and Verification (SDV)	6/23/94
EEE Parts (EEE)	6/27/94
Fracture Control Requirements (FC)	6/30/94
M&P - Oxygen Compatibility (MP)	7/07/94
Propellant - Fluids Procurement (PROP)	7/07/94
Solar Cycle (SC)	7/07/94
M&P - Aluminum Welding (MP)	7/11/94
Structural Design and Verification (SDV)	7/11/94
Ionizing Radiation (IR)	7/11/94
EEE Parts (EE)	7/11/94
M&P - Steel Welding (MP)	7/14/94
Fracture Control (FC)	7/14/94 (Canceled)
EEE Parts (EEE)	7/18/94
Propellant (PROP)	7/18/94
M&P - Welding (MP)	7/18/94
Qualification and Acceptance Testing (QA)	7/21/94
EMC/EMI (EMC)	7/21/94
Electro Static Discharge (ESD)	7/25/94
Specifications and Standards (SS)	7/25/94
Electrical M&P (EMP)	7/25/94
EEE Parts (EEE)	7/25/94
M&P - Brazing (MP)	7/28/94
Glass, Window, and Ceramic (GWC)	7/28/94
Software Standards (SW)	7/29/94
Fracture Control (FC)	8/01/94 (Canceled)

Software Standards (SW)	8/01/94	(Canceled)
Specifications and Standards (SS)	8/01/94	
Propellant (PROP)	8/03/94	(Canceled)
Battery Standards (BS)	8/04/94	
Qualification and Acceptance Testing (QA)	8/04/94	
M&P - Heat Treatment (MP)	8/08/94	
Structural Design and Verification (SDV)	8/08/94	(Canceled)
EMC/EMI (EMC)	8/08/94	
Electrical M&P (EMP)	8/08/94	(Canceled)
Glass, Window, and Ceramic (GWC)	8/11/94	
Ionizing Radiation (IR)	8/11/94	
Software Standards (SW)	8/12/94	
M&P - Heat Treatment (MP)	8/15/94	(Canceled)
Propellant (PROP)	8/15/94	(Canceled)
Battery Standards (BS)	8/15/94	
Electrical M&P (EMP)	8/15/94	
M&P - NDE (MP)	8/18/94	
M&P - NDE/Heat Treatment (MP)	8/22/94	(Canceled)
Propellant (PROP)	8/22/94	(Canceled)
EEE Parts (EEE)	8/22/94	
Electrical M&P (EMP)	8/22/94	
Software Standards (SW)	8/22/94	
Structural Design and Verification (SDV)	8/25/94	
Electro Static Discharge (ESD)	8/25/94	
Battery Standards (BS)	8/25/94	
Software Standards (SW)	8/26/94	
M&P - NDE/Heat Treatment (MP)	8/26/94	(Canceled)
Propellant (PROP)	8/26/94	(Canceled)
M&P - NDE/Heat Treatment (MP)	8/29/94	
Structural Design and Verification (SDV)	8/29/94	
M&P - Forging (MP)	8/30/94	
M&P - Heat Treatment (MP)	9/01/94	
Propellant (PROP)	9/01/94	
Software Standards (SW)	9/02/94	
Specs and Standards (SS)	9/15/94	
Electro Static Discharge (ESD)	9/22/94	
EMC/EMI (EMC)	10/18/94	
Specs and Standards (SS)	10/19/94	
Battery Standards (BS)	10/20/94	
Structural Design and Verification (SDV)	10/25/94	
Specs and Standards (SS)	10/26/94	
MIR Optical Properties Measurement (OPM)	10/26/94	
MIR Optical Properties Measurement (OPM)	10/27/94	
Propellant (PROP)	10/27/94	
Ionizing Radiation (IR)	10/31/94	
Materials and Processes (MP)	10/31/94	
MIR Optical Properties Measurement (OPM)	11/01/94	
Propellant/Propulsion (PROP)	11/03/94	
MIR Optical Properties Measurement (OPM)	11/03/94	

Battery Standards (BS)	11/08/94
Materials and Processes (MP)	11/08/94
EMC/EMI (EMC)	11/08/94
Qualification and Acceptance Testing (QA)	11/15/94
Materials and Processes (MP)	11/17/94
Battery Standards (BS)	11/17/94
Specs and Standards (SS)	11/23/94
MIR Optical Properties Measurement (OPM)	11/30/94
Specs and Standards (SS)	12/07/94
Materials and Processes (MP)	12/13/94
Propellant/Propulsion (PROP)	12/13/94
Qualification and Acceptance Testing (QA)	12/13/94
EEE Parts (EEE)	12/14/94
Electrical M&P (EMP)	12/14/94
Ionizing Radiation (IR)	12/14/94
Software Standards (SW)	12/14/94
Solar Cycle (SC)	12/15/94
EMC/EMI (EMC)	12/15/94
Battery Standards (BS)	12/20/94
Propellant/Propulsion (PROP)	12/20/94
Structural Design and Verification (SDV)	12/20/94
Ionizing Radiation (IR)	12/20/94
Electrical M&P (EMP)	12/20/94
MIR Optical Properties Measurement (OPM)	12/21/94
Qualification and Acceptance Testing (QA)	12/21/94
Specs and Standards (SS)	12/22/94
Electrical Wires and Cables (Cables)	1/10/95
Materials and Processes (MP)	1/11/95
Qualification and Acceptance Testing (QA)	1/11/95
Electrical M&P (EMP)	1/11/95

The minutes to these teleconferences have been grouped according to subject area and arranged in chronological order. They can be found in eight loose leaf binders that accompany this report. Note: in some cases, more than one subject area will appear in a binder. This was done to reduced the number of binders needed to hold the minutes. Binder titles clearly indicate the location of the minutes for each discipline. Electronic versions of all minutes and agendas are provided on appropriately labeled disks that accompany this report.

IV. SUBTASK 3: "Generate a Glossary of Key Words and Phrases related to RSA ISSA specifications and standards."

In the course of translating materials from English-to-Russian and Russian-to-English, SAIC generated a glossary of technical key words and phrases related to RSA ISSA specifications and standards. Through the use of this glossary, SAIC personnel were able to operate at maximum efficiency and effectiveness in providing oral and written translation services. It allowed SAIC's translators/interpreters to quickly familiarize themselves with difficult technical

subjects. This was a living document, one that was updated and corrected/revised on a daily basis. The final version of the glossary is provided to NASA MSFC as part of this report. It is contained in the binder entitled "English/Russian Glossary."

V. SUBTASK 4: "Establish a data base of translated materials related to RSA and NASA ISSA Specification, Standards, and Requirements."

SAIC has produced hard copies and electronically stored all translated materials generated for Task 6.9. All documents can be found on the disks that accompany this report. In addition to electronic versions, SAIC is providing both English and Russian hard copy versions of all Russian material translated into English. Each document (Russian and English version) will be placed in individual folders and hand carried to the COTR prior to the submittal of this report.